

REMARKS

Claims 1, 3, 5-7, 9 and 11-14 are in this application and are presented for consideration.

By this amendment, Applicant has amended claims 1, 6 and 12.

The Office Action states that the title of the invention is not descriptive.

Applicant has amended the title as suggested in the Office Action.

Claim 12 has been objected to because of minor informalities.

Applicant has amended claim 12 to address this issue. Applicant wishes to thank the Examiner for the careful review of the claims.

Claims 1, 3, 5-7, 9 and 11-14 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. 2002/0187769) in view of Seto et al. (U.S. 6,504,636) and further in view of NPL document "Millimeter-wave Ad-hoc Wireless Access System" (hereinafter "NPL1").

In the present invention, all communication links have a common IF frequency. The IF frequency is utilized to provide point-to-point type communication links between access point stations and point-to-multipoint type communication links with mobile radio terminals. This advantageously allows all communication links to relay/transmit via a perfectly coherent IF frequency that is in common among all communication links because the present invention is premised on a self-heterodyne type communication. This advantageously allows interference signals to be removed such that each of the mobile terminals can receive or detect signals simultaneously from a plurality of access point stations. The interference signals can be removed in the same way as a multi-pass reception since the interference signals are received

as a delayed signal of the same signal on an IF frequency band. The IF frequency circuits provided on the plurality of access point stations can be shared. This advantageously allows the system to be produced at a significantly lower costs since each of the access point stations can make signal processing in the same frequency band. The prior art as a whole fails to disclose such features or such cost reducing advantages.

Johnson et al. discloses a wireless cellular communication system that receives millimeter-wave signals from a central office and converts them to a cellular band for transmission by a cell base station. Each base station picks off the signals in its 32 MHz slice of a 91-93 GHz spectrum, down-converts this band to the cell phone band and broadcasts it. The 91-93 GHz band is also re-transmitted to the next base station in the chain. At each base station a local oscillator is set to a slightly different frequency, which determines the 32 MHz wide slot that is assigned to that base station. If a spread-spectrum local oscillator was used on the up-conversion at the central office, then the appropriate pseudo random code must be used again in the down-converter's local oscillator to recover the original information. At the telephone company central switching office calls are detected, switched and routed between various cellular base stations and the landline network. Each group of cellular base stations at the central office is represented by a 32 MHz wide slot of spectrum, which is up-converted to the 91-93 GHz band and sent out over a point-to-point link to the chain of several base stations.

Johnson et al. fails to teach and fails to suggest the combination of a control access point station that broadcasts and delivers a first signal in a first RF frequency band to each

mobile radio terminal located within a coverage area of the control access point. The Office Action takes the position that it would have been obvious to one of ordinary skill in the art to incorporate the central office functionalities within a base station for the purpose of lowering costs and making the system easier to manage by having both a base station and central office in the same location. Applicant respectfully disagrees as Johnson et al. must provide some teaching or suggestion for the features claimed. A fair reading of Johnson et al. only discloses a central telephone office that transmits millimeter-wave signals to base stations. The central telephone office of Johnson et al. clearly does not transmit two different signals wherein the signals have different RF frequency bands as claimed. Compared with Johnson et al., the control access point station transmits two different signals wherein one signal in one RF frequency band is transmitted to one or more mobile radio terminals and another signal in another RF frequency band is transmitted to a first repeater access point station. This advantageously reduces the cost of constructing the wireless access system since only one control access point station is necessary for the system. Johnson et al. fails to be concerned with such cost saving techniques since Johnson et al. only teaches and suggests that the central telephone office transmits signals to base stations. The central telephone office of Johnson et al. simply does not transmit another signal to one or more mobile radio terminals within a coverage area of the central telephone office as claimed. As such, the prior art as a whole fails to establish a prima facie case of obviousness because the prior art as a whole does not teach or suggest each feature of the claimed combination.

Johnson et al. fails to provide any teaching or suggestion for a second repeater access

point station that converts and divides a reception signal in a RF frequency band into two signals in an IF frequency band and converts the two signals in a third signal in a third RF frequency band and a fourth signal in a fourth RF frequency band based on a self-heterodyne procedure from the divided signals in the IF frequency band. The Office Action relies on paragraphs [0033] and [0040] - [0042] of Johnson et al. to teach that two signals in an IF frequency band are converted into a third signal in a third RF frequency and a fourth signal in a fourth RF frequency band. Applicant respectfully disagrees with this interpretation of Johnson et al. Paragraph [0033] of Johnson et al. only discloses that each base station picks off the signals in its 32 MHz slice of the 91-93 GHz spectrum, down-converts this band to the cell phone band, and broadcasts it while the 91-93 GHz band is also re-transmitted to the next base station in the chain. Paragraphs [0040] - [0042] of Johnson et al. teach that millimeter-wave transceiver A transmits at 92.3 - 93.2 GHz and receives at 94.1-95.0 GHz while millimeter-wave transmitter B transmits at 94.1-95.0 GHz and receives at 92.3-93.2 GHz. However, neither paragraph [0033] nor paragraphs [0040] - [0042] of Johnson et al. discloses that two signals in an IF frequency band are divided wherein the two signals are converted into a third signal in a third RF frequency band and a fourth signal in a fourth RF frequency band based on a self-heterodyne procedure from the divided signals in the IF frequency band as claimed. In contrast to the present invention, Johnson et al. merely discloses that the base stations act as relays to transmit the same signal from one base station to another station wherein each base station receives signals within a particular frequency range. Compared with Johnson et al., one access point station of the present invention divides a signal received from

another access point station wherein signals are generated in third and fourth RF frequency bands based on a self-heterodyne procedure from the divided signals in the IF frequency band. This significantly reduces costs of constructing the wireless access system since the IF frequency circuits provided on the plurality of access point stations of the present invention are shared. This advantageously allows each of the access point stations can make signal processing in the same frequency band. Johnson et al. fails to disclose such cost-saving advantages since Johnson et al. does not provide signal processing that is in the same frequency band as claimed. As such, the prior art as a whole takes a different approach and fails to establish a prima facie case of obviousness as the prior art as a whole does not direct a person of ordinary skill in the art toward each and every feature of the claimed combination.

Seto et al. fails to provide any teaching or suggestion for the combination of a second repeater access point station that converts and divides a reception signal in a RF frequency band into two signals in an IF frequency band and converts the two signals in a third signal in a third RF frequency band and a fourth signal in a fourth RF frequency band based on a self-heterodyne procedure from the divided signals in the IF frequency band. Seto et al. merely discloses an optical communication system for optically transmitting transmission data from a transmitting station to a transmitting device that includes an adder for adding an intermediate frequency subcarrier signal modulated with data to be transmitted to a pilot carrier signal as a sinusoidal wave. However, Seto et al. provides no teaching or suggestion for a second repeater access point station that generates signals in third and fourth RF frequency bands based on a self-heterodyne procedure from divided signals in an IF frequency band as claimed.

In fact, Seto et al. fails to make any mention of a control access point station that broadcasts and delivers a first signal in a first RF frequency band to each mobile radio terminal located within a coverage area of the control access point as featured in the present invention. As such, the prior art as a whole does not establish a prima facie case of obviousness as the prior art as a whole fails to teach or suggest important features of the claimed combination.

NPL1 fails to provide any teaching or suggestion for the combination of a second repeater access point station that converts and divides a reception signal in a RF frequency band into two signals in an IF frequency band and converts the two signals in a third signal in a third RF frequency band and a fourth signal in a fourth RF frequency band based on a self-heterodyne procedure from the divided signals in the IF frequency band. At most, NPL1 discloses a double-side-band (DSB) millimeter-wave self-heterodyne transmission technique to a RF transceiver. However, the references as a whole provide no suggestion of using the teachings of NPL1 to modify the device of Johnson et al. In fact, none of the cited prior art references, including NPL1, teach or suggest a control access point station that transmits two different signals wherein one signal in one RF frequency band is transmitted to one or more mobile radio terminals within a coverage area of the control access point and another signal in another RF frequency band is transmitted to a first repeater access point station. As such, the prior art as a whole does not establish a prima facie case of obviousness as the prior art as a whole does not direct a person of ordinary skill in the art toward essential features of claimed combination. Accordingly, Applicant respectfully requests that the Examiner favorably consider claims 1, 6 and 12 as now presented and all claims that respectively depend thereon.

Favorable consideration on the merits is requested.

Respectfully submitted
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